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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 24243-2009

**Chromium ores -- Increment sampling
(English Translation)**

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Table of Contents

Foreword	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	5
4 General principles of sampling	7
5 General sampling methods	8
6 Equipment	12
7 Sampling method	14
Appendix A (Normative) Hammer-shovel sampling method	21

1 Scope

The Standard specifies methods for sampling chromium ores at the place of delivery and the place of receipt.

The method is applicable to increment sampling of all natural chromium ores or processed chromium ores by manual and mechanical methods.

Appendix A specifies the procedure for increment sampling of lumpy chromium ores with a particle size >100 mm by the shovel sampling method using a hammer.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, all subsequent amendments (not including errata content) or revisions do not apply to this standard. However, parties to agreements that are based on this Standard are encouraged to study whether the latest versions of these documents can be used. For undated references, the latest edition applies to this Standard.

GB/T 24232, Manganese and chromium ores - Experimental methods for checking the bias of sampling and sample preparation (GB/T 24232-2009, ISO 8541:1986, IDT) GB/T 24233, Manganese and chromium ores - Experimental methods for evaluation of quality variation and methods for checking the precision of sampling (GB/T 24233-2009, ISO 8542:1986, IDT) ISO 565:1983 (E), Test sieves - Woven metal wire cloth, perforated plate and electroformed sheet - Nominal sizes of openings ISO 6154:1989 (E), Chromium ores - Preparation of samples

3 Terms and definitions

For the purposes of this Standard, the following terms and definitions apply.

lot

A certain quantity of chromium ores processed or produced under assumed identical conditions.

consignment

A certain quantity of chromium ores delivered at one time. A consignment may consist of one lot, several lots or part of a lot of chromium ores.

increment

(1) A certain quantity of chromium ores taken at one time from a consignment of chromium ores using a sampling device.

(2) A certain quantity of chromium ores obtained by increment division.

sub-sample

(1) A certain quantity of chromium ores consisting of two or more increments taken from a consignment of chromium ores.

(2) A sample formed by combining two or more increments after selective crushing and/or selective division, as necessary.

gross sample

(1) A certain quantity of chromium ores consisting of all increments taken from a consignment of chromium ores.

(2) A combination of all increments or all sub-samples after selective crushing and/or selective division, as necessary.

two-stage

Firstly, primary sampling units are selected from a consignment, and then secondary sampling units are selected from the selected primary sampling units. In this standard, this method may be used for sampling from trucks or containers. During sampling, a certain number of trucks or containers shall first be selected as primary sampling units, and then increments shall be taken from the selected trucks or containers as secondary sampling units.

4 General principles of sampling

The following principles are common to and shall be complied with by all parties concerned.

- a) Qualified sampling devices or qualified mechanical sampling devices approved by the buyer and/or seller shall be used.
- b) Sampling should preferably be carried out simultaneously before and after weighing, or during loading and unloading.
- c) When sampling is started at random, systematic sampling shall be adopted.

Sampling of chromium ores from trucks may be carried out by the two-stage method or stratified sampling method.

- d) In order to prevent systematic errors from being introduced during sampling, the increment mass shall be determined according to the nominal top size of the chromium ores.
- e) The number of increments taken from a consignment shall be determined according to the type of quality variation of the chromium ores and the required sampling precision.
- f) Sample contamination shall be prevented throughout the entire sampling process.
- g) All sampling methods shall be verified in accordance with GB/T 24232 to confirm that there are no systematic errors.
- h) If the expected number of increments has been taken before completion of the operation, increments shall continue to be taken at the same intervals until the loading and unloading operation of the chromium ores in the consignment is completed.
- i) Sampling shall be carried out in compliance with national safety standards.

5.1 General sampling procedure

The general sampling procedure is as follows.

- a) Identify the consignment to be sampled.
- b) Determine the nominal top size of the consignment.
- c) Determine the mass of the increment.
- d) Determine the type of quality variation of the consignment.
- e) For systematic sampling and stratified sampling, determine the minimum number of increments to be taken from the consignment. For two-stage sampling, specify the trucks or containers to be selected from the consignment and the locations at which increments are to be taken from the selected trucks or containers.

- f) Determine the interval for taking increments in systematic sampling and stratified sampling, or the interval for selecting trucks or containers in mass-based sampling.
- g) Determine the sampling locations and the method for increment sampling.
- h) Prepare the gross sample or sub-sample in accordance with ISO 6154. The procedure for preparing the gross sample or sub-sample is shown in Figure 1.

Figure 1 - Sampling flow chart

5.2 Sampling precision and overall precision

The sampling precision (betas) to be achieved by the sampling method specified in this Standard is given in Table 3. Sampling precision is a component of the overall precision (betaSDM), and is based on the practice of sample preparation in accordance with ISO 6154 and determination in accordance with the methods specified in the relevant national standards.

Overall precision refers to the average value of the quality characteristic of the consignment at a probability level of 95%. Sampling precision refers to the condition that, at a probability level of 95%, the difference between the average chromium oxide content of the gross sample and the actual grade of the consignment is not greater than betas.

betas is the sampling precision, which is equal to twice the sampling standard deviation, expressed as a percentage.

betaSDM is the overall precision of sampling, sample division and determination, which is equal to twice the standard deviation of the entire process of sampling, sample division and determination, expressed as a percentage.

The sampling precision shall be verified in accordance with GB/T 24233.

5.3 Mass of increment

5.3.1

The minimum mass of an increment for manual sampling shall be determined according to the maximum particle size specified in Table 1.

Table 1 - Minimum mass of increments for manual sampling

The masses of the increments taken shall be substantially uniform.

Note: "Masses substantially uniform" means that the variation in masses (expressed as the coefficient of variation) is less than 20%. The coefficient of variation (CV) is defined as the ratio of the standard deviation (sigma) to the average mass of the increments ($\bar{X}$), and shall be calculated according to Formula (1), expressed as a percentage.